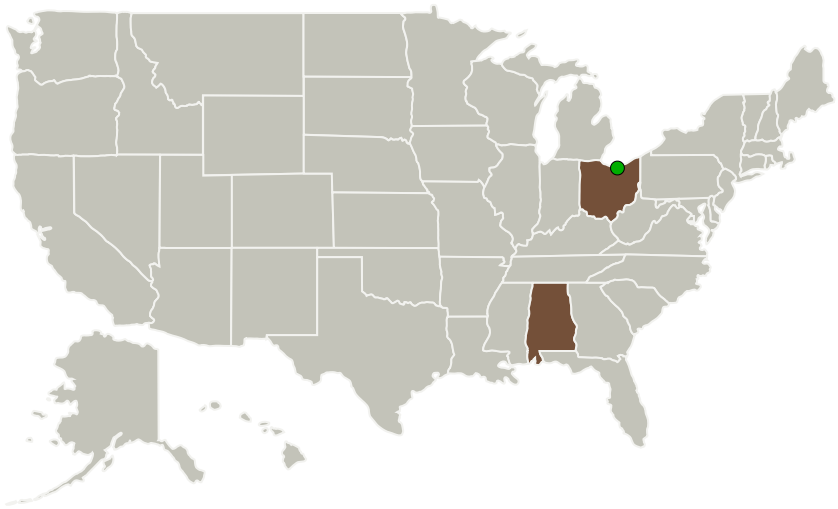
Non-Toxic HAN Monopropellant Propulsion, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

Non-toxic monopropellants have been developed that provide better performance than toxic hydrazine. Formulations based on hydroxylammonium nitrate (HAN) have superior performance as compared to hydrazine with Isp (261 seconds, 12% greater), higher density and volumetric impulse, lower melting point, and much lower toxicity (No self contained breathing apparatus required). HAN based monopropellants require higher chamber temperatures (2083K vs 883K) to combust. Current hydrazine based combustion chamber technology (Inconel or niobium C103 and silicide coating) and catalyst (Shell 405) are inadequate. However, current state of the art iridium lined rhenium chambers are compatible with monopropellants and new ignition techniques are being developed. The goal of the SBIR project is fabricate and test a flight weight thrust chamber for HAN based monopropellants.

Primary U.S. Work Locations and Key Partners



Organizations Performing Work	Role	Type	Location
Glenn Research Center(GRC)	Supporting Organization	NASA Center	Cleveland, Ohio

Primary U.S. Work Locations	
Alabama	Ohio

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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Project Transitions

February 2011: Project Start

August 2011: Closed out

Closeout Summary: Non-Toxic HAN Monopropellant Propulsion, Phase I Project Image

Closeout Documentation:

- Final Summary Chart Image*(https://techport.nasa.gov/file/140164)*

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Principal Investigator:

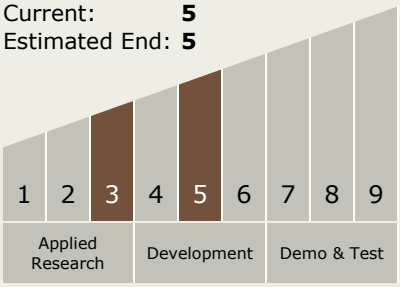
Timothy N Mckechnie

Co-Investigator:

Timothy Mckechnie

Technology Maturity (TRL)

Start: **3**
Current: **5**
Estimated End: **5**



Technology Areas

Primary:

- TX01 Propulsion Systems
  - TX01.1 Chemical Space Propulsion
    - TX01.1.2 Earth Storable

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Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System